CA2 ALOG
R23
1967

ALBERTA LEGISLATURE LIBRARY
3 3398 00437 3204

OGCB 68-12

~~Alberta Energy Resources Conservation Board~~

REPORT OF THE OPERATIONS OF THE OIL AND GAS CONSERVATION BOARD

1967

OIL AND GAS CONSERVATION BOARD
603 SIXTH AVENUE SOUTH WEST • CALGARY, ALBERTA

LEGISLATURE LIBRARY
SEP 19 2017
PROVINCIAL LIBRARY
VICTORIA B. C.
EDMONTON

Digitized by the Internet Archive
in 2019 with funding from
Legislative Assembly of Alberta - Alberta Legislature Library

REPORT OF THE OPERATIONS OF THE OIL AND GAS CONSERVATION BOARD

1967

OIL AND GAS CONSERVATION BOARD
603 SIXTH AVENUE SOUTH WEST • CALGARY, ALBERTA

903 SIXTH AVENUE SOUTH WEST • CALGARY, ALBERTA
OIL AND GAS CONSERVATION BOARD

1961

THE OIL AND GAS CONSERVATION BOARD

REPORT OF THE OPERATIONS OF

C O N T E N T S

	Preface	
I	The Alberta Oil and Gas Industry in 1967	1
II	Responsibilities and Functions of the Board	9
III	Organization and Staff	11
IV	Legislative Changes	15
V	Duties, Organization and Major Activities of Board Departments	17
	A Development Department	18
	B Oil Department	26
	C Gas Department	29
	D Geological Department	32
	E Data Processing Department	35
	F Economic Studies Department	39
	G Accounting Department	40
	H Office Services Department	44
	I Personnel Department	45
VI	Expenditure and Revenue	47
VII	Publications	51
	Map of Alberta Showing Oil and Gas Fields	

IV Explanation and Argument 15

A Introduction 15

B Police Related Department 19

C Fire Department 25

D Geological Department 28

E Data Processing Department 32

F Economic Studies Department 35

G Research Department 40

H Police Related Department 47

I Technical Department 52

V Conclusion and Recommendations 59

VI Implementation Schedule 71

VII Bibliography 73

P R E F A C E

This report is the fifth edition of an annual report on the operations of the Oil and Gas Conservation Board. It is introduced with a brief discussion of the general activities of the oil and gas industry in 1967, emphasis being placed on those related to conservation. Following this is a summary of the constitution, responsibilities and functions of the Board; a discussion of its organization and staff; and a general summary of important statutory changes affecting the Board. The main section of the report deals with the responsibilities, organization and activities of the several departments of the Board and discusses the role of each in the discharge of the overall responsibilities of the Board. Finally, there is a statement of Board expenditures and revenues, comparing them with previous years and with indices of industry and Board activity.

I THE ALBERTA OIL AND GAS INDUSTRY IN 1967

Exploration

The north-western part of the Province continued to attract a high level of exploratory activity. Further important oil discoveries were made in the Rainbow and Zama Lake areas and a number of wells also encountered gas. Predominantly gas-oriented exploration was widely directed and resulted in an apparently significant discovery in the Quirk Creek region west of Turner Valley and a substantial southward extension of the Kaybob South Gas Field, near Grande Prairie.

As measured by the 756 wildcat wells drilled in 1967, exploration activity fell by some 6 per cent over the total of 800 wildcat wells drilled in 1966. However, total exploratory footage drilled declined by only 3 per cent during the same period, with the result that the average well depth increased from 4,880 feet in 1966 to 5,023 feet in 1967. A much higher degree of success was achieved in 1967, when the proportion of successful wildcat wells was 36 per cent, as compared to 27 per cent in 1966.

Development

The total of development wells drilled in the Province in 1967 was 839, approximately the same as in 1966. The number of successful oil wells in the total was lower than in 1966, 481 as compared to 516, whereas the number of successful gas wells was somewhat higher, 163 as compared to 136. Development footage drilled declined by some 6 per cent during 1967 to 4,130,704 feet, as compared to 4,383,273 feet during the previous year. Hence, the average well depth decreased from 5,237 feet in 1966 to 4,923 feet in 1967.

Development drilling for oil was concentrated in the Rainbow and Zama Lake areas, with some additional drilling occurring in the Nipisi and Clive regions. Development drilling for gas was located principally in the Crossfield, Brazeau River, Kaybob South and Craigend-Tweedie areas.

Reserves

Initial recoverable reserves of crude oil increased by some 598 million barrels during 1967. Production totalled 230 million barrels; hence, remaining reserves increased by some 368 million barrels to 7,129 million barrels as at December 31, 1967, as compared to 6,761 million barrels at the end of 1966.

Most of the increase in initial reserves of crude oil is attributable to newly discovered pools in the Rainbow-Zama Lake areas. About 100 million barrels of the increase results from enhanced recovery operations in six medium sized pools. The balance accrues from pool development and small discoveries not yet fully evaluated at year end.

Initial reserves of marketable gas increased by 2.6 trillion cubic feet to 47.0 trillion cubic feet, as at December 31, 1967. After allowing for production during 1967 of approximately 1 trillion cubic feet, the remaining reserves of marketable gas rose from 38.1 trillion cubic feet at December 31, 1966, to 39.7 trillion cubic feet at December 31, 1967. As with the crude oil reserves, the additions to gas reserves resulted primarily from appreciation of reserves in previously discovered pools, particularly in the Brazeau River, Kaybob South, Edson and Medicine Hat areas.

Reserves of propane rose by some 22 million barrels in 1967 to a level of 407 million barrels at December 31, 1967, while butane reserves increased by some 17 million barrels to a level of 273 million barrels over the same period. Pentanes plus reserves, after declining by some 55 million

barrels in 1966 over 1965, rose by 59 million barrels in 1967 to reach 676 million barrels at the year's end. Thus, total reserves of natural gas liquids were some 1,356 million barrels as at December 31, 1967, as compared to 1,258 million barrels at the end of 1966.

Sulphur reserves increased to some 117 million long tons, a rise of seven million over the 1966 level. These numbers exclude expected recovery of sulphur from the Great Canadian Oil Sands project.

Crude Oil Productive Capacity

The Board has again published an assessment of the Province's crude oil productive capacity in its Annual Reserves Report, OGCB 68-18[1]. As discussed in that report, the Board identified four types of productive capacity: (1) Maximum Efficient Reservoir Capacity, (2) Developed Wellhead Capacity, (3) Developed Capacity Adjusted for Field and Processing Facility Limitations, (4) Developed Capacity Adjusted for Pipe Line System Limitations. The Board estimates that as at December 31, 1967, the capacity for these categories was some (1) 2.1 million barrels per day, (2) 1.5 million barrels per day, (3) 950 thousand barrels per day and (4) 860 thousand barrels per day respectively. In each category there was a modest increase over the capacity estimated in 1966.

Production and Markets

For the third year running, substantial growth was recorded in the production of crude oil, which rose from 555,000 barrels per day in 1966 to 631,000 barrels per day in 1967, an increase of nearly 14 per cent. During the year synthetic crude oil was produced for the first time at the Great Canadian Oil Sands plant. Production from this source was confined to a

---

(1) Reserves of Crude Oil, Gas, Natural Gas Liquids and Sulphur, Province of Alberta, December 31, 1967.

small scale initially and did not commence until the latter part of the year, so that the volume averaged no more than 1,000 barrels per day on an annual basis. An increase of some 5 per cent occurred in pentanes plus production, which averaged 81,000 barrels per day in 1967, as compared to 77,000 barrels per day in 1966.

The amount of Alberta oil production, including synthetic crude oil and pentanes plus, absorbed by Canadian markets rose from 368,000 barrels per day in 1966 to 383,000 barrels per day in 1967. This represents an increase of some 4 per cent, similar to the increase in total requirements for Canadian crude oil west of the Ottawa Valley, so that Alberta's share of the market has remained virtually unchanged since 1966 at 61 per cent. Consumption of Alberta crude oil within Alberta averaged 96,000 barrels per day, as compared to 93,000* barrels per day in 1966. The most pronounced increase in demand occurred in the export market. Exports from Alberta to the United States rose from 264,000 barrels of crude oil per day in 1966 to 330,000 barrels per day in 1967, or by 25 per cent. Estimates of the extent to which exports were aided by the disruption of Middle East supplies to the U.S.A. during the Suez crisis vary from 20,000 barrels per day to 30,000 barrels per day, the majority of which is attributable to abnormal demand on the U.S. West Coast. The range indicates that, in the absence of the crisis, exports would have grown by between 11 and 12 per cent.

Net natural gas production increased from 1,150 billion cubic feet in 1966 to 1,243 billion cubic feet in 1967. After allowance for processing shrinkage, plant fuel requirements and unavoidable waste within Alberta, marketable gas production was 960 billion cubic feet, as compared

*Revised Figure

to 889* billion cubic feet in 1966, an increase of some 8 per cent. The majority of the increase in marketed production was absorbed by exports, which increased 17 per cent over 1966. Alberta gas marketed within Canada rose by 4 per cent from 506 billion cubic feet in 1966 to 526 billion cubic feet in 1967. The portion of production consumed within Alberta expanded from 189 billion cubic feet in 1966 to 199 billion cubic feet.

Production of propane and butane exhibited strong growth in 1967. Net propane production rose by 13 per cent from 31,000 barrels per day in 1966 to 35,000 barrels per day in 1967, while net butane production averaged 23,000 barrels per day, as compared to 20,000 barrels per day in 1966, a 15 per cent increase. These increases are a reflection partly of the rise in natural gas production and also more extensive processing and recovery, principally at the Carstairs, Jefferson and Nevis plants. The growth in propane production was more than absorbed by an increase in offshore exports, while a slight reduction occurred in Alberta demand.

Production of sulphur rose by 23 per cent from 1,676,000 long tons in 1966 to 2,116,000 long tons. Additional sulphur production resulted from the processing of Lookout Butte gas at the Pincher Creek plant and the establishment of a new plant at Harmatton-Elkton, as well as the installation of new or enlarged extraction facilities at several existing plants. At 1,284,000 long tons, shipments of sulphur to Canadian and U.S. markets showed only a small per cent increase from the 1966 level of 1,262,000 long tons. However, exceptional increases occurred in offshore shipments, which rose by some 83 per cent from 465,000 long tons in 1966 to 851,000 long tons in 1967. In total, an approximate balance was struck between deliveries and production of Alberta sulphur, with the result that inventory levels remained

*Revised Figure

stable in 1967 after three years of continual decline.

Conservation Activity

Developments in Oil

A notable development during the year was the inception of synthetic crude oil production at the Great Canadian Oil Sands plant. Construction and site preparation were completed on schedule and the plant commenced operations in September.

The transition period to the new proration plan entered its third and penultimate year in May, 1967. The incentives contained in the new plan for the commencement of enhanced recovery schemes have continued to stimulate activity of this nature. In total, two dozen new enhanced oil recovery schemes were instituted during the year. These employed a variety of pressure maintenance methods ranging from high pressure gas in the Ante Creek Beaverhill Lake Pool to a solvent bank in the Pembina Cardium Bear Lake project and inert gas injection at the Buffalo Lake D-3 Pool. A pilot scheme was approved for the injection of solution gas in the Rainbow South Keg River B Pool. The Rainbow Keg River A Pool, for which the Board approved a pilot gas injection scheme in 1966, was converted to full pressure maintenance subsequent to a Board hearing in the early part of 1967. Water injection was commenced at the Rainbow Keg River B Pool. Efforts were intensified to achieve full pressure maintenance in the Turner Valley Rundle A Pool and the Board undertook an evaluation of solvent flood schemes in the North Cardium Pembina Unit No. 1. The latter was reported on in OGCB Report 67-B[2].

---

(2) Report and Decision on Review of Certain Solvent Flood Operations in the Pembina Cardium Pool, May, 1967.

Developments in Gas and Propane

During 1967 the Board heard applications by Trans-Canada Pipe Lines Limited and Alberta and Southern Gas Co. Ltd. for approval to remove additional quantities of gas from the Province. The Board reported on these applications in OGCB Report 67-C(3) published in October, 1967, and, with the approval of the Lieutenant Governor in Council, issued a new permit to Trans-Canada authorizing the removal of an additional 2.1 trillion cubic feet of gas from the Province over a 25 year period ending October 31, 1992. An amendment to one of the Alberta and Southern permits was issued authorizing removal of an additional 160 billion cubic feet of gas over the period ending October 31, 1991.

A minor reduction was made in the amount of gas which may be removed from the Peace River area under a permit of the Westcoast Transmission Company Limited as the result of a hearing at which the deletion of a number of minor pools not connected to the system and the reserves of pools currently supplying the permit were considered.

Gas conservation facilities were extended in the Pembina, Swan Hills and Willesden Green Fields and deep cut facilities were approved for a gas processing plant at Sylvan Lake.

New gas plants were approved for the Equity-Ghost Pine, Bigstone, Kaybob South, Judy Creek, Rainbow, Sylvan Lake, Vulcan and Caroline Fields. In the initial stages, the Kaybob South plant will process gas principally from a cycling scheme approved for the Kaybob South Beaverhill Lake A Pool. Other developments approved by the Board during the year included a gas storage scheme for the Carbon Field and the processing of Lookout Butte gas at the Pincher Creek plant.

---

(3) Report on the Applications of Trans-Canada Pipe Lines Limited and Alberta and Southern Gas Co. Ltd. under The Gas Resources Preservation Act, 1956, October, 1967.

Government Revenue

Total Government revenue from oil and gas mineral rights rose from $228 million in 1966 to $234 million in 1967. The 1967 total reflects rental payments of $54 million, which were virtually unchanged compared to 1966, and a substantial expansion in royalty payments, which rose from $75 million to $93 million. The latter increase outweighed a further reduction in the proceeds from Crown Reserve sales, which declined by 11 per cent from $99 million to $88 million.

Industry Revenue

Revenue to the oil and gas industry from production in Alberta during 1967 totalled $911 million, an increase of 15 per cent over the 1966 level of $792 million. Sales of crude oil and pentanes plus continued to yield the largest revenue and rose by some 12 per cent from $594 million to $663 million. In proportionate terms, this increase is slightly less than the increase in the volume of production and indicates minor reductions in the average price of crude oil and equivalent during the year. By contrast, price increases were an important component of increased revenue from other sources. This is most evident in relation to sulphur, revenue from which increased from $37 million in 1966 to $65 million in 1967, or by nearly 75 per cent, as compared to an increase of 24 per cent in the volume of sales. Gas, propane, and butane revenue rose by some 14 per cent in total, with gas revenue amounting to $151 million, an 11 per cent rise, propane totalling $21 million, 34 per cent more than in 1966, and butane amounting to $12 million, a 23 per cent increase. Price increases were particularly significant with respect to propane and accounted for over 50 per cent of the increase in revenue.

II RESPONSIBILITIES AND FUNCTIONS OF THE BOARD

The Board is established by The Oil and Gas Conservation Act for the purpose of administering that Act. It is also charged with the administration of The Gas Resources Preservation Act, 1956, and The Turner Valley Unit Operations Act. Additionally, it may be called upon to supply information and advice to the Department of Mines and Minerals, particularly in connection with applications for permits under The Pipe Line Act, 1958. Finally, the Board, like the Public Utilities Board, may refer applications that touch on matters in part within the purview of each of the Boards to the Gas Utilities Board, of which the Chairman of the Oil and Gas Conservation Board is a member and to which the Board gives technical and other assistance in connection with applications referred by it.

The purposes of The Oil and Gas Conservation Act are to effect the conservation and prevent the waste of the oil and gas resources of the Province, to secure the observance of safe and efficient field practices, and to afford each owner of oil or gas the opportunity of obtaining his share of the production of any pool. The Board must see that, in the light of sound engineering and economic principles, oil field operations are so conducted that wells are properly located, spaced, drilled, equipped and produced so that the recovery of oil or gas from a pool is not lessened and reservoir energy is not improperly dissipated, that enhanced recovery techniques are used where suitable, that waste of gas is minimized, that proper storage facilities are used, and that oil or gas is not produced in excess of demand or of storage and transportation facilities.

To carry out these functions the Board employs the appropriate personnel including engineers, geologists and others. It maintains a head

office in Calgary and area offices in major oil and gas regions. The Board issues regulations and orders pertaining to drilling and producing operations; considers applications by operators; has its staff conduct inspections and make studies; and collects, summarizes and publishes various data.

Under The Oil and Gas Conservation Act, the Board also is charged with the examination of schemes, either of an experimental or commercial character, for obtaining production from oil sands. The Board also, under Part VII of the Act, assesses and taxes oil and gas properties to obtain a revenue to cover a portion of its expenses under the Act. The carrying out of its duties and responsibilities under this Act and other Acts requires the Board to conduct investigations, hold hearings and prepare reports.

The Turner Valley Unit Operations Act empowers the Board, upon application, to order a part of the Turner Valley Rundle Pool to be operated as a unit. Under this Act, four oil productive and one gas productive units have been established encompassing substantially all of the Turner Valley Field.

The purpose of The Gas Resources Preservation Act, 1956, is to provide for the effective utilization of the gas resources of the Province, having regard to the present and future needs of persons within the Province. For this purpose, the Board must from time to time determine the volumes of established reserves of gas and propane in the Province and the trends in growth and discovery of gas and propane reserves and the present and future needs for gas and propane within the Province. Applications for permits for the removal of gas or propane from the Province are considered in the light of such determinations and may be granted if it is in the public interest to do so.

III ORGANIZATION AND STAFF

The Board consists of three members, including a Chairman, Deputy Chairman and Board Member, appointed by the Lieutenant Governor in Council. The members are appointed for a five-year term, with extensions of the term at the pleasure of the Lieutenant Governor in Council.

The Board's senior advisers are its Chief Engineer and Solicitor. They provide technical and legal advice directly to the Board, and where appointed for the purpose, function as acting Board members. An Applications Advisory Group under the Chairmanship of the Chief Engineer and including the Board Solicitor and the Managers of the Gas, Oil and Development Departments advises the Board on routine applications.

The organization chart as presented indicates the overall organization of the Board showing its various departments. The departments vary in size, ranging from 73 employees in the Development Department to four in the Personnel Department. Each Department Head is responsible to the Board for carrying out the functions assigned to his department as summarized in Section V of this report. In addition to the normal department responsibilities, the Managers of the Oil Department, the Gas Department and the Development Department serve with other senior staff as examiners at hearings.

During 1967 the Board substantially completed its conversion to the I.B.M. System 360/30 computer which replaced the LPG-30 computer and Univac 1004 data processing systems in 1966.

In 1967, the Board maintained five area offices staffed by Engineers and Technicians whose basic responsibility is to inspect drilling and producing procedures in oil and gas fields. Area offices are located at Red Deer, Black Diamond, Medicine Hat, Drayton Valley and

Edmonton. The Engineer or Area Supervisor in charge of each area office is responsible to the Senior Development Engineer who, in turn, is responsible to the Manager of the Development Department.

In general, the Board's Development Department is responsible for the drilling and production practices of the industry, and the Oil and the Gas Departments are responsible for ensuring maximum conservation from oil and gas pools as discovered and developed. The Gas Department is additionally responsible for assisting the Board in controlling the volume of gas and propane removed from the Province. The Geology Department, the Data Processing Department and the Chemical Laboratory provide technical assistance to the Board directly, and to the three main engineering departments. The Economic Studies Department and the Production Accounting Division of the Accounting Department provide economic and statistical data and assistance. The Economic Studies Department also administers the crude oil proration plan with the assistance of the Oil Department. The Office Services and the Personnel Departments, and the Financial Accounting Division perform services for the Board organization as a whole.

The Board had an approved staff complement of 272 employees at the year end. This represents an increase of eight during the year. Of the total staff, 216 were located in Calgary, 51 in the Board's area offices and five in the Chemical Laboratory in Edmonton. The actual number of employees at December 31, 1967, was 266.

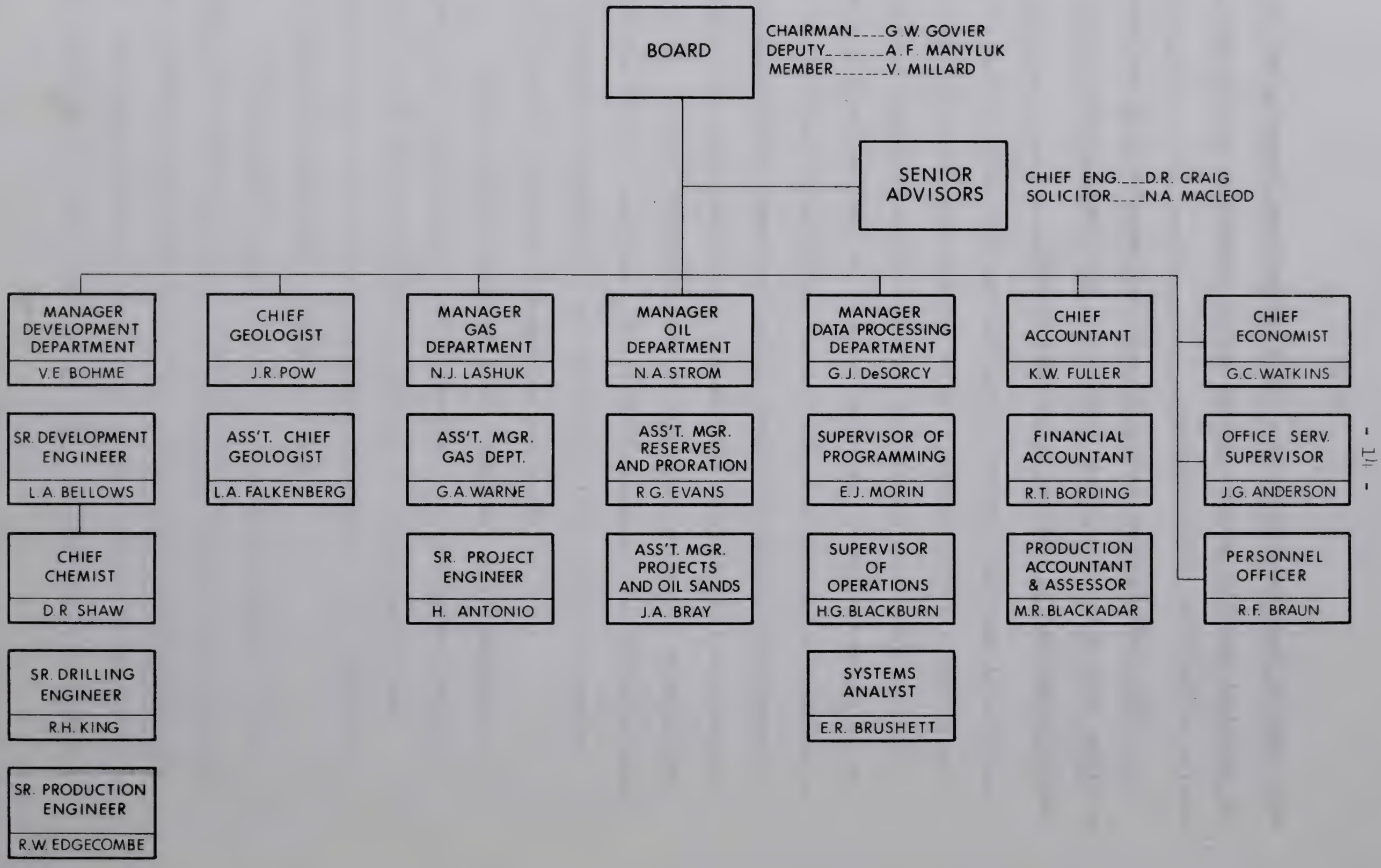
During 1967 the Board held five on-premises courses to further its employee development program. The Board also provided financial assistance to 42 of its employees who attended off-premises courses during the year. Two employees were on Education Leave to attend full-time university during which time partial salaries were paid. In addition, four courses

were taken by Board personnel at the I.B.M. Educational Center as part of the technical upgrading program carried out in conjunction with the conversion to the I.B.M. 360/30 computer.

The staff turnover during the past year amounted to 58 employees or 21 per cent of the total Board complement. This compares with a turnover of 23 per cent in 1966 and 31 per cent in 1965.

OIL AND GAS CONSERVATION BOARD

BOARD ORGANIZATION



MARCH 1, 1968

IV LEGISLATIVE CHANGES

Statutes

The Oil and Gas Conservation Act was amended by chapter 58 of the Statutes of Alberta, 1967. Many of the amendments so provided were in anticipation of a revision and consolidation of regulations under the Act, and the statute was proclaimed in force as of January 1, 1968, when the new regulations also became effective.

Among the provisions taken from the Act with a view to replacing them with regulations were those dealing with fees, with the requirements of licence applications, with the posting of well licences, with the shutting down of wells and with well names. Added to the Act were some definitions and additions to the provisions authorizing regulations.

Other amendments to the Act changed the well licensing authority from the Minister of Mines and Minerals to the Board, and authorized the Board to approve of a scheme for the concurrent production of an oil zone and its gas cap.

Regulations

In 1967, regulations made under The Oil and Gas Conservation Act were revised and consolidated in the new Oil and Gas Conservation Regulations, which came into force on January 1, 1968. The old Drilling and Production Regulations, General Regulations, Well Licence Deposit Regulations and Rules of Practice of the Oil and Gas Conservation Board were rescinded.

The preparation of the new regulations was largely the work of a committee consisting of some members of the Board's staff and nominees of the industry associations. The committee reviewed all the regulations of general application administered by the Board and all its subsisting

"policy letters". The regulations were extensively reorganized, revised and rewritten, and a new index was prepared. Those provisions no longer considered useful were dropped, and some new regulations were added, most of which were based on old policy letters or check lists used by the Board staff in considering applications. This was the first thorough review of the regulations in ten years. The new regulations are, the Board believes, complete, up-to-date, and so organized that anyone using them may do so with ease and confidence.

V DUTIES, ORGANIZATION AND MAJOR ACTIVITIES OF BOARD DEPARTMENTS

This section of the report deals with the make-up and principal activities of the nine Board Departments. The technical departments are described first.

Before outlining the departmental activities, it is probably worthwhile to mention the overall activity in the consideration of registered applications. During 1967 the Board received 564 applications of the type which it registers individually. This volume is slightly higher than prevailed in the previous year. Such applications are those which, if approved, would result in the issuance of a Board order, approval or permit. They are exclusive of routine applications such as those for drilling licences and well allowables which are processed on a day-to-day basis. Public hearings were held in connection with 102 of the applications, 34 of them by Board members and the balance by examiners selected from among the senior staff and appointed by the Board. Approximately 88 of the applications were considered after giving public notice for objections and the balance were of a routine nature and dealt with directly by the Board and its staff.

Most of the Board departments are involved with the processing of applications from time to time. In fact, the functions related to applications form a large part of the work load of the Board organization. Many of the applications require extensive technical analysis and subsequent reports to the Board. The review of performance of approved schemes also demands considerable attention from the technical departments.

In addition to the foregoing, there are two other general activities in which the Board and its staff participated. One of these is

contributing to the work of technical or legal committees of various government and industry organizations. Among the organizations having Board representation in 1967 were the Alberta Advisory Committee on Pollution Control, the Provincial Mines Ministers' Conference, including the Interprovincial Petroleum and Natural Gas Committee and its working committees,the Interstate Oil Compact Commission committees, the Alberta Petroleum Industry Training Service, the Petroleum Technology Committee of the Southern Alberta Institute of Technology, the War Supplies Agency of the Department of Defence Production, the Emergency Measures Organization and The Federal Provincial Oil and Gas Statistical Committee. The second activity is in providing limited and specialized on-the-job training to staff members of oil and gas conservation agencies of other governments. Requests for this service are received through the Government of Canada under the Colombo Plan and also occasionally are made directly by a foreign or Commonwealth Government. In 1967 only two delegates from India required special training. A four-week on-premise program was provided, and arrangements were made for a further three-month program with various operating companies.

A DEVELOPMENT DEPARTMENT

The Development Department is responsible for matters within the Board's jurisdiction concerning the drilling, completing and producing of wells.

The Department is divided into three main sections: the Drilling Division under the Senior Drilling Engineer, the Production Division under the Senior Production Engineer, and the Area Offices and Chemical Laboratory supervised by the Senior Development Engineer. The responsibilities, functions and organization of each of these is described in more detail

below.

(a) Drilling Division

This division's main responsibilities are to ensure the proper location of wells, to reduce the possibility of subsurface contamination and blowout hazard by specifying proper procedures for casing, cementing and abandoning wells and, through inspections by the field staff, to ensure that drilling operations are properly conducted.

The major functions of the division are

(1) to process applications to drill, suspend, rework, plug back or abandon a well; to specify casing, cementing and completion practices; to calculate from directional surveys penalty factors for off-target wells;

(2) to appraise and make recommendations to the Board regarding the disposition of applications for: special drilling spacing units, compulsory pooling to form drilling spacing units, and relief from penalty factors for off-target wells;

(3) to maintain files and records respecting well names and changes thereto, unit agreement areas, well licences, well licence transfers, amendments and cancellations, and appointment of agents; and

(4) to review drilling and service rig inspection reports from the Board field staff, and correspond with contractors regarding the recommendations arising from the rig inspections.

The Division staff complement during 1967 was as follows: the Senior Drilling Engineer, one Drilling Engineer, two Engineering Assistants, two Stenographers and one Clerk.

Applications for 1812 drilling licences were examined and recommended for issuance by the Minister of Mines and Minerals. A large number of applications for waiver of off-target penalty were processed, most of them from the Rainbow-Zama area. A number of applications for special drilling spacing units were also processed, most of these being for one half section units to provide for locating the well close to the boundary between two normal quarter section drilling spacing units.

A study to ascertain the probability of blow-outs in the Rainbow-Zama area was completed during the year, resulting in regulations which required the use of additional blowout control equipment on rigs operating in the area. Additional data was collected during the year on the proper waiting time for cement abandonment plugs, which indicated that some policy changes may be desirable.

Four blow-outs occurred where complete loss of well control resulted. All were brought under control quickly without serious loss of oil or gas, although fires accompanying two of the blow-outs damaged the drilling rigs. There were numerous instances of threatened blow-out and "kicks" in the Rainbow-Zama area, but good equipment and prompt action forestalled any serious blow-outs.

One prosecution was instituted for failure to submit daily drilling reports as required by the Regulations.

(b) Production Division

The Production Division's major responsibility is to ensure accurate measurement of produced or injected reservoir fluids, both on a pool-wide and individual well basis. The Division is also responsible for such matters related to production as reduction of physical waste and control of air, water or soil pollution, approval of new types of production equipment, disposal of produced water, approval and surveillance of

multi-zone completions, and control of common flow lines.

The principal functions of the Division are

(1) to co-ordinate field staff inspections of measurement practices, well testing procedure and production accounting and to correspond with the operators regarding the results of these inspections; to perform periodic audits of company production accounting methods at their major offices;

(2) to deal with requests for exemption from gas measurement for wells or pools;

(3) to appraise applications for water disposal schemes and recommend disposition of them, to review disposal methods for produced water and recommend volume restrictions for surface disposal where necessary; to review field reports regarding air, water and soil pollution and require operators to take the necessary steps to curb air pollution from well production facilities; and

(4) to process applications for multi-zone completions and common flow lines and schedule and evaluate segregation tests on multiple completions.

The Division staff complement during 1967 was as follows: the Senior Production Engineer, two Production Engineers, one Engineering Assistant and a Stenographer.

Activities During the Year

Of the 46,224,000 barrels of salt water produced in 1967, 98 per cent were disposed to subsurface formations. Where volumes of salt water disposed to surface facilities increased to a potential pollution level, or where adequate subsurface facilities were available, the division reduced

the amount of surface disposal permitted, to ensure that contamination of soil and potable water would not occur.

During the year, 46 wells were dually completed and ten restored to single zone status, bringing the year-end total of dual completions to 416. Nine cases of commingling between zones were detected by semi-annual segregation tests, and the necessary steps taken to regain segregation.

Air pollution complaints were infrequent during 1967. Most of the complaints resulted from sulphurous odours occurring when battery flares went out. In the Calgary area, several complaints arose as a result of the testing and cleaning of sulphurous gas wells. These led to a number of meetings of representatives of the Board, the Department of Health, and the operators in the area to reconsider the equipment and procedures necessary to reduce odour levels resulting from these operations. Flare stack heights of 75 to 100 feet were found necessary and, also, flaring was restricted to periods of weather conditions favourable for the reduction of pollution levels.

(c) Area Offices

The chief duties at the area offices are to ensure that The Oil and Gas Conservation Act, the regulations thereunder, and the various other requirements of the Board are observed by the industry at the field level. The area office personnel gather drilling and work-over data, check subsurface pressure data using Board equipment, and procure fluid samples for analysis by the Chemical Laboratory.

To carry out these responsibilities, there are a number of separate duties which together comprise most of the work load of the area offices.

The major duties are

(1) to advise operators on the requirements of the Act, Regulations and Board policy regarding field operations;

(2) to issue or approve abandonment and casing programs;

(3) to check wells, batteries, measurement equipment and drilling and service rigs for compliance with the Regulations; to witness dual completion operations, segregation tests, back pressure tests and casing and abandonment operations;

(4) to carry out subsurface pressure measurements, calibrate pressure instruments, and gather representative samples of oil, gas and water for analysis;

(5) to check operators' production practices and reporting procedures and make reports on gas processing plants, salt water disposal systems, pressure maintenance projects and gas conservation schemes; and

(6) to prepare weekly drilling progress and rework reports.

Organization and Staff

Five Area Offices at Edmonton, Drayton Valley, Red Deer, Medicine Hat and Black Diamond are supervised by Area Engineers or Area Supervisors who report to the Senior Development Engineer in Calgary.

At the end of 1967, the total field staff complement consisted of six Engineers, 37 Technicians, two Clerks and six Stenographers, unchanged from the previous year-end.

Activities During the Year

Drilling activity dropped slightly during 1967, with 1,567 wells

drilled, compared to 1,640 in 1966. More than half of the total wells (815) were drilled in the Edmonton area. The Rainbow and Zama Fields were the schene of major activity during the year and special emphasis was placed on rig inspections in the area to ensure that blow-out prevention equipment and practices were satisfactory. Following discussions with operators in the area, extra blow-out prevention equipment was required and special courses in blow-out prevention for rig crews were initiated through the co-operation of the Drilling Training School and the Petroleum Industry Training Service.

The number of operating oil wells in the Province increased by 412 during the year, to a total of 9,301. The number of batteries decreased by 72 during the year although several new fields were developed. This decline was caused by operators building larger batteries and consolidating batteries concurrent with the formation of production spacing units. Inspection of producing operations is a major item in the field work and includes inspection of wells, batteries, gas well installations and fluid meters. Special emphasis was directed toward improving the accuracy of water measurement at gas wells, since the presence of water has a serious effect on the recovery of gas from a pool. Audits were made of selected production reports of about half the operators in the Province. Responsibility for reconditioning the surface at well sites has now been assumed by the Surface Reclamation Council in surveyed areas and by the Department of Lands and Forests in unsurveyed areas, leaving the Board responsible for only the mechanical condition of wells and batteries.

Five special well abandonment and repair projects were undertaken by Board staff during the year. All the wells are in the southern part of the Province and in every case except one the Milk River Formation was the source of gas leaking around the well. The cost of approximately $45,000

was met by the Department of Mines and Minerals and the work was supervised by the Senior Production Engineer.

(d) Chemical Laboratory

The staff of the Chemical Laboratory, located in Edmonton, is responsible for the selection and analysis of samples of oil, gas and water which are representative of the fluid content of various formations in Alberta. In addition, it obtains either the results of analyses from well owners or analyses samples supplied by the owners. From these data sources, representative analyses for most of the oil and gas productive zones of the Province are selected and published. The Laboratory also performs any analytical investigations related to production, disposal, or pressure maintenance problems encountered by the field staff. Certain facilities are made available to the University of Alberta, and the Chief Chemist provides a limited amount of assistance with research projects of both the University and the Research Council of Alberta.

The analytical and clerical work is performed by two Technicians and two Typists and is supervised by the Chief Chemist.

Activities During the Year

The analysis of 648 samples occupied the majority of the working time of the laboratory technicians. All reports to the Board of drill stem tests and initial production tests were checked for fluid recovery and samples of all clean fluids recovered were analyzed or the analyses of them made by others were processed. A total of 3,487 oil, gas, and water analyses carried out by well owners and others were filed with the laboratory. The information on all analyses was compiled on cards which are used for general reference and in preparation of the Board's fluid analyses publications. Special studies included a program to standardize analyses of viscous crude

oils made by company and commercial laboratories, and a number of emulsifying agents were tested to determine their toxicity and their effectiveness in cleaning up oil spills.

B OIL DEPARTMENT

Responsibilities and Functions

The Oil Department is concerned with matters affecting conservation and correlative rights in crude oil production operations. It is responsible for the assessment and surveillance of enhanced recovery operations, assessment of reserves and productive capacity of oil pools, oil well spacing, oil sands schemes, experimental schemes, and technical matters relating to the proration plan.

The principal functions of the Oil Department relate to reservoir engineering and are

(1) to determine initial and remaining oil reserves, reserves growth trends and maximum rate limitations of production;

(2) to review the performance of all oil pools and enhanced recovery schemes therein, and recommend to the Board means of improving conservation in pools where it is feasible;

(3) to assess applications for enhanced recovery schemes, pilot tests, and commercial and experimental oil sand schemes, and assess in cooperation with other departments applications concerning water disposal, concurrent production and production measurement;

(4) to assess applications respecting oil well drilling spacing units, production spacing units, blocks and projects and related matters;

(5) to coordinate measurements and maintain records of subsurface pressure surveys of oil pools in the Province; and

(6) to initiate Board orders for fields and pools; to establish minimum allowance allocations of production spacing units, blocks and projects; to advise the Board respecting ultimate reserves, recovery factor modifiers, and maximum rate limitations and to advise the Economic Studies Department in the preparation of the monthly crude oil production allowable order.

Organization and Staff

The Oil Department staff includes 14 Engineers, 16 Technical-Clerical Assistants, one Stenographer and one Typist. The engineering staff is divided into two main divisions. The Reserves Division is responsible for evaluation of oil reserves, recovery factor modifiers and maximum rate limitations and for assessment of applications respecting oil well drilling spacing units, production spacing units, blocks and projects. The Projects Division is responsible for evaluation of proposed enhanced recovery schemes, surveillance of enhanced recovery operations in conventional crude oil pools, oil sands recovery schemes and experimental schemes. The clerical-technical group provides assistance to each engineering division, prepares basic technical data and performs routine Board administrative duties.

Activities During the Year

Development of new crude oil reserves was centred mainly in the Rainbow and Zama areas during the year. Most of the occurrences are of the pinnacle reef type requiring only one or two wells to drain the pool. Hence at year's end the 200 producing wells in the areas were completed in some 150 separate pools. Thus, the number of oil pools in the Province, each of which requires individual reservoir engineering analysis, increased by about

one quarter during the year. Developments in Rainbow and Zama have led to a need for core analyses, reservoir fluid analyses and regular bottom-hole pressure surveys of virtually every well. This has seriously taxed available field survey equipment, laboratory facilities and technical personnel, all needed to obtain and evaluate the data.

Among the two dozen new enhanced oil recovery schemes launched in crude oil pools during the year, the more significant or unusual ones were the miscible flood schemes at Ante Creek Beaverhill Lake (high pressure gas) and Pembina Cardium Bear Lake (solvent bank), and the inert gas injection scheme at Buffalo Lake D-3. Evaluation of the efficacy of the solvent flood schemes in the North Pembina Cardium Unit No. 1 culminated in a Board report[4] on the matter. Efforts to achieve full pressure maintenance in the Turner Valley Rundle A Pool were further stepped up with the introduction of significant restrictions on withdrawals from the gas cap in certain regions.

The staff participated where needed in preparing revisions to the Act and the drafting of the new Oil and Gas Conservation Regulations. The new regulations incorporate much of the intent of the previously existing regulations and otherwise specified Board policy. The changes of main importance to the Oil Department were the adoption of new oil well target area provisions, revised central area provisions for production spacing units (PSU's) and the requirement of Board approval for concurrent depletion of a gas cap and its oil zone.

Some administrative difficulties were experienced in specifying details of the Board's policy and procedures in the new proration plan

---

(4) OGCB Report 67-B - Report and Decision on Review of Certain Solvent Flood Operations in the Pembina Cardium Pool, May, 1967.

which goes through its fourth and last year of transition from May, 1968 to May, 1969. To eliminate unnecessary administrative work, a considerable number of crude oil pools were transferred from the formally prorated category to the good production practice category in the MD Order. The amount of undrilled acreage in PSU's increased only modestly from the level of 108,000 acres at December 31, 1966, to 122,000 acres at December 31, 1967. This reduced trend in growth of undrilled acreage in PSU's reflects the single-well pool type of development taking place in the pinnacle reefs in the Rainbow and Zama Areas.

C GAS DEPARTMENT

Responsibilities and Functions

The Gas Department is concerned with the conservation of gas and related products, including propane, butanes, pentanes plus and sulphur. In addition, the Department is responsible for the determination of the reserves and deliverability of gas, natural gas liquids and sulphur, and for assessing the availability of gas to meet requirements of the various utility systems in the Province.

Specifically, the Department has the following functions

(1) in the administration of The Oil and Gas Conservation Act

(a) to establish permissible rates of production for gas wells, determine frequency of gas well tests and prescribe methods of testing wells and calculating flow potentials;

(b) to review the production performance of all gas pools;

(c) to carry out studies with regard to the establishment of gas conservation schemes;

(d) to review the performance of gas processing facilities and review regularly, at the request of the Public Utilities Board, the requirements for and availability of gas to the smaller gas utility systems;

(e) to review, at the request of the Department of Mines and Minerals of the Provincial Government, applications to construct pipe lines and to advise the Department of the Board's findings;

(f) to review the performance of all schemes conserving gas produced unavoidably with oil;

(2) in the administration of The Gas Resources Preservation Act

(a) to calculate reserves in all pools in the Province of gas, propane, butanes, pentanes plus, condensate and sulphur; to assist the Board in assessing applications for removal from the Province of gas and propane;

(b) to determine the deliverability of gas produced from fields connected, or expected to be connected, to intraprovincial and extraprovincial markets at such time that applications for removal of gas from the Province are considered by the Board; and

(c) to determine the availability of propane in the Province at such times as applications for removal of propane from the Province are considered by the Board.

Organization and Staff

The Department is primarily technical in nature, and is headed by the Manager. The Assistant Manager is responsible for the day-to-day operations of the department. Two section heads, the Reserves Engineer and the Projects Engineer, oversee and co-ordinate the evaluation of gas reserves and appraise the merits of various proposals presented to the Board concerning gas matters such as processing plant applications and cycling schemes. The remainder of the staff comprises three Engineers, four Engineering Assistants, five Clerks, and a Stenographer.

Activities During the Year

The Department considered and approved during the year two applications for the removal of a total of some 2.3 trillion cubic feet of additional gas from Alberta. In addition, following a hearing, two fields were deleted from a permit and the amount of gas which could be removed from the Province under the permit was reduced by 75 Bcf. The volumetric estimates of the reserves of some 500 pools were considered as part of the assessment of reserves of pools included in the applications and in determination of year end reserves. In addition, comprehensive reviews of the production and pressure histories of pools were begun with a view to making greater use of such data in reserve estimates. In considering the volumes included in permits, detailed reviews of the deliverability of most of the principal gas pools in the Province were also made.

The question of whether cycling of gas reserves containing large amounts of natural gas liquids should be permitted at declining reservoir pressures was considered further during the year following receipt of the results of laboratory investigations submitted by applicants. A comprehensive study of the Gold Creek Field was made to determine whether a

cycling scheme should be instituted in the field. After hearing representations from operators in the field and based on the results of its own studies, the Board did not require the pool to be cycled.

Studies were made of the economic feasibility of conserving gas produced in some 12 oil fields and areas. In oil pools where gas plant capacities were inadequate to accommodate the rates of gas production at oil allowable levels, the alternatives were reviewed and as a result part of the production of some large pools was deferred until adequate plant capacity was available. The resulting underproduction in those pools was made up during the interim by temporary increases in the oil allowables of pools where gas processing facility limitations were not restrictive.

Applications were considered for approval of eight new gas processing schemes, and for modification of about the same number of existing schemes. The modifications proposed usually comprised increases in plant capacities, improvement in sulphur or natural gas liquid recovery facilities or installation of LPG recovery facilities where such facilities were not included previously.

The staff continued its surveillance of rates of gas production and at the annual hearing considered the need for allowable orders and the imposition of maximum rates for some 30 pools. Additional emphasis was placed on obtaining reliable water production data for gas pools through field investigation.

D GEOLOGICAL DEPARTMENT

Responsibilities and Functions

The Geological Department is responsible for the preservation and evaluation of certain well data, the administration of the Board's well evaluation requirements, the mapping of oil and gas reservoirs and the

preparation of subsurface geological maps. The Department also makes special studies related to these responsibilities to assist other Board departments and the Alberta Department of Mines and Minerals. Additionally, the Board's Core Storage Center is administered by the Department and provides for the processing, storing and public examination of all core and important drill cuttings recovered from wells drilled in the Province. The Drafting Section of the Geological Department is responsible for the preparation of all maps, charts, and graphs, and all general drafting for the Board organization.

The main functions of the Department are

(1) to administer the coring, logging, drill stem testing and drill cutting requirements of the Board and to collect and store logs and drill stem test charts;

(2) to receive, process, and provide examination facilities for drill cuttings and core at the Core Storage Center;

(3) to evaluate hydrocarbon-bearing intervals at all productive wells and prepare maps to delineate the area and volume of each pool;

(4) to identify, record, and publish the names and depths of the stratigraphic markers penetrated by all wells drilled;

(5) to investigate and report on the geological aspects of submissions or other evidence filed with the Board;

(6) to advise the Board, other Board departments, and the Department of Mines and Minerals on geological matters;

(7) to assist the Development Department in ensuring that a well drilled to supply an oil field water injection scheme does not interfere with domestic water supplies;

(8) to maintain geological, cross-sections, well location and status maps for sale and on-premise use;

(9) to classify each well licensed in accordance with the Lahee classification system; and

(10) to provide all drafting services necessary for the Board's functions.

Organization and Staff

The Chief Geologist is both head of the Geological Department and Chief Geologist of the Alberta Department of Mines and Minerals. Within the Geological Department there are three distinct sections. The Geological Section comprises the Chief Geologist, the Assistant Chief Geologist, ten Geologists, three Geological Assistants, two Stenographers and one Clerk. The Core Storage Center is headed by a supervisor responsible to the Chief Geologist and includes a staff of 14. The Drafting Section consists of five Draftsmen, including the Chief Draftsman who reports to the Chief Geologist.

Activities During the Year

(1) Geological Section

During the year, stratigraphic markers were identified and published for over 1,640 wells and hydrocarbon-bearing zones were evaluated for some 915 wells.

Due to an increase in applications and submissions from operators for production spacing units, pressure maintenance schemes, and off-target penalty relief, a greater percentage of time was devoted to these matters. Many investigations involved meetings with the operators.

Miscellaneous activities included geological classifying of wells, determining casing requirements and collecting stabilized pumping levels on water supply wells, investigating near-surface blowouts in areas where test hole applications were received, and approving logging and coring programs and abandonment applications.

Geological work for the Department of Mines and Minerals consisted of evaluating parcels at Crown reserve sales, processing P. & N.G. reservation reports for lease credit, preparing zone designations and providing technical advice on applications for gas lease credit.

(2) Core Storage Center

Activity at the Center has continued at a high level. An average of about 21 geologists used the examination facilities each working day. A total of 106,000 boxes of core and 450,000 drill cutting samples were examined. Six additional examination booths were installed during the year.

All backlog core has been received into storage and approximately 26,500 boxes of core cut during the year were placed into storage. Some 251,000 sets of drill cuttings were processed.

(3) Drafting Section

The drafting of illustrations for published Board reports and preparation of base maps for areas of oil field development accounted for a large part of the section's work. There was a considerable increase in drafting special forms, graphs, and charts for the Data Processing Department in preparation for the applications of the new computer system.

E DATA PROCESSING DEPARTMENT

Responsibilities and Functions

The Data Processing Department is responsible for carrying out systems planning, program development, electronic machine operations, staff training related to data processing, and for surveying electronic data processing activities and new equipment development.

More specifically, the functions of the Department are

(1) to analyse existing and proposed manual and electronic systems with a view to designing and implementing new

systems, improvements and innovations;

(2) to analyse and appraise proposed computer applications;

(3) to write engineering, accounting, statistical, and economic computer programs as required in the work of the Board organization;

(4) to conduct effective closed-shop programming by educating Department staff and maintaining an appropriate literature and program library;

(5) to encourage open-shop programming by educating appropriate staff from other departments and by assisting with programming assignments where necessary;

(6) to accurately process data received from other departments in order to obtain statistics for internal use or for publication;

(7) to perform computer calculations for geological and oil and gas engineering evaluations;

(8) to advise the Board on advances in the field of computer technology; and

(9) to familiarize supervisors and personnel throughout the organization with computer applications, data processing, and effective systems planning.

Organization and Staff

The Data Processing Department staff is made up of twenty permanent employees and an additional five employees who are attached to the Department on a temporary basis in connection with the conversion to a new computer system. The staff is organized in two divisions under the Manager and two Supervisors, one of Programming and one of Operations. There is also a

Systems Analyst who reports directly to the Manager.

A mid-year reorganization resulted in the combining of what were formerly the Engineering Programming Division, the Systems and Procedures Task Force and the Business Programming Task Force into a Programming Division. Most of the staff assigned to the task forces were temporary and have returned to their home departments. The Programming Division is responsible for all computer systems and programs required by other departments in the Board organization. During the past year it has been concerned primarily with the development of non-technical processing systems such as production accounting and allowable calculations, and with the development of the Board's well data and core analysis storage and retrieval systems. The Systems Analyst has throughout the past year worked closely with the Programming Division in the development of new computer systems. The Operations Division is responsible for all functions related to electronic machine processing. The Data Transcribing Work Force is made up of clerical staff and is responsible for the gathering and transcribing of basic well data for integration into the well data storage and retrieval system.

Activities During the Year

During 1967 the Programming Division concentrated its efforts on implementing systems and related programs that were of immediate interest to the Board organization. At year-end approximately 200 operational computer programs supported some 25 systems and application areas.

Some of the major undertakings completed by this group during the year include systems for the tabulation of oil, gas, and water production, disposition and injection statistics; the calculation of allowables and the cumulative allowable status; the payroll application for the Board organization; and the assessment and taxation of oil and gas productive areas in the Province.

The Programming Division has also been very active in the development of a basic well data and a core analysis storage and retrieval system. At year-end, portions of the core analysis file were available for internal use and conversion of data for the basic well data file from cards to the final tape file format had commenced. Progress during the year has been such that it is anticipated that both of these systems will be operational by mid-1968.

The Operations Division has completed a year of transition; two independent machine systems were phased out and replaced by a third system. At times this required the simultaneous encoding and processing of business and engineering data for three separate systems.

The Univac 1004 system was retained for the first two months of the year. During this period the system was used to complete the processing of routine business applications such as oil and gas production summary and disposition, oil proration to market demand and oil allowables for the previous year and also to produce a number and variety of year-end reports.

The LGP-30 has been phased out gradually over the year and at year-end was being used only on a very limited basis. Some 5,000 applications (approximately one-half the normal number) in the field of engineering, statistics and economics, have been processed on the machine. It is expected that the LGP-30 will be disposed of by the Board early in the current year.

During the past year the work load on the new system, the IBM 360/30, has increased steadily. The initial surge occurred in January with the conversion of most of the Production Accounting system to handle statistics for the current year. This base load was added to by the expansion of business oriented applications, the development of several engineering applications, and by work related to the development of the basic well data and core analysis systems. During the final two months of the year, the 360/30

was used in excess of two shifts per day.

The Data Transcribing Work Force is responsible for the transcribing of basic well data for all backlog wells in the Province. By the end of 1967, data for approximately 30,000 wells had been transcribed and stored in punched card form. The transcribing of data on backlog wells will be completed by the end of the first quarter of 1968 and this temporary work force will be disbanded.

F ECONOMIC STUDIES DEPARTMENT

Responsibilities and Functions

The Economic Studies Department is responsible for economic analysis and evaluation, the compilation of statistics and preparation of the monthly proration order.

The main functions of the Economic Studies Department are

(1) in co-operation with the Oil and Gas Departments, to forecast demand and supply for liquid hydrocarbons, sulphur, and natural gas in the Province of Alberta;

(2) to prepare a five-year forecast of petroleum industry activity relative to the functions of the Board to serve as a basis for the Board's annual five-year expenditure and revenue forecast;

(3) to carry out special studies relating to economic aspects of conservation and applications presented to the Board;

(4) in co-operation with the Oil Department, to carry out the monthly oil proration computations; and

(5) to compile statistical and other information covering all aspects of the oil and gas industry.

Organization and Staff

The staff complement at December 31, 1967, comprised a Chief Economist, an Assistant Economist, an Economics Assistant, Statistical Clerk and a Stenographer.

Activities During the Year

The Department's regular activities were supplemented by a number of special projects. Previous forecasts of Alberta oil demand were reviewed and a new forecast prepared. Incorporated in the latter was a detailed background study of markets for Canadian oil in U.S.A. District II. The Department was closely concerned with preparatory work relating to the implementation of changes in the Proration Plan, scheduled for May, 1968. An assessment was also made of the effect of various reserve and demand forecasts on future trends in pool allowables under the new Proration Plan.

In connection with applications by Trans-Canada Pipe Lines Limited and Alberta and Southern Gas Co. Ltd. to remove additional amounts of natural gas from the Province, the Department reviewed and updated the Board's previous forecast of Alberta's long-term natural gas requirements.

The Department continued to appraise short-term forecasting techniques, which have been applied principally to short-term projections of propane supply and demand.

G ACCOUNTING DEPARTMENT

The Accounting Department's responsibilities are carried out under two separate divisions, financial accounting and production accounting. The Chief Accountant is the head of the Department and reports to the Board.

Financial Accounting Division

Responsibilities and Functions

The Financial Accounting Division is responsible for all general

accounting and budget preparation. It assists in the collection of the Board's annual tax levy and provides the Board with all information for budget control.

The major functions of the Division are

(1) to process all expenditures, receive all revenues and maintain all necessary records;

(2) to close the accounting records as at March 31 each year and co-operate with a representative of the Provincial Auditor in his annual audit;

(3) to prepare, in co-operation with the other departments, the budget for Board approval for the next fiscal year and prepare a five-year forecast of expenditure and revenue;

(4) to provide the Board with monthly statements comparing budgeted and actual expenditure and revenue, to assist in the maintenance of control over expenditure, and to establish current financial policy;

(5) to assist, in co-operation with the Assistant Assessor, in the collection and follow-up of outstanding tax accounts;

(6) to maintain records necessary to the control of all inventorial assets of the Board and to supervise the annual physical check of inventory items.

Organization and Staff

The Financial Accountant is the head of the Division and is responsible to the Chief Accountant. The staff complement at December 31, 1967, included the Financial Accountant, five Accounting Clerks, one Typist and a Bookkeeping Machine Operator.

Activities During the Year

During 1967, the general accounting functions embracing revenues, expenditures and budget were generally routine.

The payroll system was totally reviewed and new computer programs were written for a payroll-personnel records system that was put into effect in January, 1968.

The inventory policy was revised in late 1967 to reduce maintenance costs by increasing the minimum value of an inventory item.

Production Accounting Division

Responsibilities and Functions

The Production Accounting Division is responsible for the receipt and processing of oil and gas production and disposition reports, and the preparation of detailed and summary information for use by the Board, industry and other agencies. The Assessment Section also is a part of the Production Accounting Division.

The major functions of the Division are

(1) to collect from industry the well production data and well and plant disposition data required under The Oil and Gas Conservation Act;

(2) to ensure that the reporting forms in use provide for the collection of required information and are revised to meet changing needs; and to co-operate with other provincial and federal agencies in the use of comparable forms, and in the avoidance of duplicate collections of original data, where possible;

(3) to examine the reports received to ensure that regulatory requirements are met by the operators and, with the assistance of the Data Processing Department, to prepare

detailed and summary records;

(4) to check the reported oil, gas, and water production against assigned allowables and notify operators of the over or under status for each of their wells;

(5) to maintain records of production spacing units, blocks, projects, and single wells in connection with the new proration plan, showing minimum allowances and assigned acreages, and to make such records available to the Economic Studies Department for the preparation of the monthly proration order;

(6) to ensure that the monthly and annual statistical reports and well and pool production publications are kept up to date and processed on schedule; and

(7) to prepare the assessment roll, to issue assessment notices, process appeals, issue tax notices, and assist in the collection of the tax levy.

Organization and Staff

The Production Accountant and Assessor is the head of the Division and is responsible to the Chief Accountant. He is assisted by the Assistant Assessor, the Statistics and Publications Supervisor, the Production Records Supervisor, 20 Clerks and a Stenographer.

Activities During the Year

During 1967, the major functions of the division were subjected to a major revision with the full implementation of new systems and procedures designed to utilize the new IBM 360/30 computer equipment. The report processing routines and preparation of the 1967 assessment were converted in an orderly manner, although several refinements were necessary. The maintenance of allowable status records was disrupted by the difficulties encountered in

conversion and were not current at year end. The publication of much year-end statistical data will be later than normal due to the systems change and efforts to utilize the computer facilities to the greatest extent possible in the direct printing of most publications.

During 1967, the exchange of well production data in punch cards and magnetic tape commenced and at least three more companies will submit production data in this form early in 1968.

H OFFICE SERVICES DEPARTMENT

Responsibilities and Functions

The Department is responsible for purchasing, printing and mailing, control of well records and central filing, building requirements and services, and switchboard and reception duties.

The major functions are as follows:

(1) to attend to space, service and insurance requirements of all Board buildings;

(2) to maintain a purchasing and stock control program;

(3) to observe and control motor vehicle operating costs;

(4) to print or arrange for commercial printing of letters, orders, forms, reports, publications, maps, amendments to Acts, regulations and the Index to Board Orders; to maintain address plates for subscription lists, mail lists, and for various record-opening forms for new wells;

(5) to attend to all mailing functions and to operate all file systems other than department; to serve public requests for information from filed documents;

(6) to provide hearing reporter and library services; and

(7) to maintain drilling records for all wells drilled.

Organization and Staff

The Department is headed by the Office Services Supervisor who reports to the Board. There are three sections in the Department: Purchasing, Reproduction, and Records, each headed by a Supervisor. The staff complement includes 18 Clerks, six Machine Operators and six Receptionists, Switchboard Operators, Typists and Stenographers. In 1967 the departmental complement was reduced by two with the transfer of a typist position to the Personnel Department and a reduction of one in the clerical complement of the Records section.

Activities During the Year

There was no significant change in the level of activity as compared to 1966 other than a slight increase in the number of purchase orders issued and orders and approvals issued by the Board.

I PERSONNEL DEPARTMENT

Responsibilities and Functions

The Personnel Department is responsible for attracting and maintaining competent staff to conduct the Board's business, and also for ensuring that the Board's policies relating to personnel are carried out.

The principal functions are

(1) to recruit new staff in co-operation with other departments;

(2) to administer programs of employee evaluation, staff education and employee benefits;

(3) to administer the Board's salary policy and conduct annual salary surveys; and

(4) to prepare, with the assistance of the other departments, the annual salary budget for the next year and record variances during the current year.

Organization and Staff

The Department is headed by the Personnel Officer, who reports to the Board. He is assisted by a Personnel Assistant, one Stenographer and one Typist.

Activities During the Year

The Department carried out its annual survey of salaries paid by industry and by the Provincial and Federal Governments to assist the Board in its annual salary review. Other surveys in which the Board participated were analysed in order to ensure that the Board's salaries and other benefits were competitive. These surveys included such items as travel allowances and expense accounts.

The program to achieve and maintain a high degree of technical and supervisory proficiency was continued by conducting several on-premises courses, as well as by encouraging continued formal education.

In line with current practice in the oil industry, the use of punch clocks was discontinued.

During 1967, conversion of personnel records to the I.B.M. 360/30 system was completed.

VI EXPENDITURE AND REVENUE

The Board's fiscal year end is March 31, but, since all other sections of this report relate to the calendar year, the Board has decided to ignore the three month difference and treat expected expenditures and revenues relating to the fiscal year April 1, 1967 to March 31, 1968, as applying to the 1967 calendar year. Financial data for previous fiscal years are applied to the calendar year in a similar manner.

Table 1 provides a summary and comparison of expenditures and revenues for the years 1963 to 1967 inclusive. The Board's net expenditure represents the sum of salary, general operating, and capital expenditures less collections from the sale of publications and information. The cost of capital acquisition is charged in full against revenue in the year of purchase. Revenue of the Board is received through the levy of a tax upon the assessed value of all oil and gas properties liable to assessment and by a grant from the Provincial Government.

During the last five years, the Board's net expenditure has increased at an average annual rate of 6.9 per cent. Net expenditure during 1967 was $2,345,000, an increase of $224,000, or 10.6 per cent over the previous year. Salary expenditures increased by $170,000 or by 9.6 per cent to $1,948,000, while other general operating expenses increased by $39,000 or 7.3 per cent to $573,000. Capital expenditure increased by $5,000 to $51,000, and collections decreased by $10,000 or 4.2 per cent to $227,000.

The 9.6 per cent increase in salary costs during 1967 was above the five-year average of 6.7 per cent. This increase was due to a fairly significant general increase in rates of pay for the Board's staff and a rise of eight in staff complement.

Table 2 gives a comparison of Board expenditures in terms of wells

capable of production, industry production revenue, and equivalent barrels of production*. Industry production revenue represents the total sales value of crude oil, natural gas, and products at the well or plant. In 1967 the value of crude oil sales represented 73 per cent of the total production revenue as compared to 75 per cent in 1966.

The cost of operating the Board in terms of a capable well increased from $125 in 1966 to $133 in 1967. A review of these costs over a longer period indicates that Board expenditure per capable well increased steadily until 1957, when it reached $136 and has been declining through 1965. Recent significant increases in salary costs, and the reduced rate of increase in the number of capable wells, have reversed that trend in 1966 and 1967. Board expenditures per equivalent barrel of production revenue decreased from 0.72 cents to 0.66 cents over the period 1963 to 1967. Efficient utilization of electronic data processing equipment, and substantial increases in growth rate of industry revenue were largely responsible for this reduction in unit costs.

For 1967, as in previous years, the Provincial Government will provide the funds necessary to meet approximately 47.5 per cent of the Board's net expenditure. This amounts to some $1,115,000 and represents a direct grant from the Provincial Government of $938,000 to meet 40 per cent of the net expenditure and an additional $177,000, being the Government's share of the Board's tax levy. The remainder of the tax levy charged to all other owners of oil and gas properties assessed amounted to $1,230,000 in 1967, an increase of $116,000 over the previous year.

The assessed value of oil and gas properties subject to assessment in 1967 was $1,838,000,000 resulting in a mill rate of 0.78 mills to raise the portion of Board revenue met by taxation.

---

* Equivalent Barrels = total industry production revenue divided by weighted average price per barrel of oil

TABLE 1

OIL AND GAS CONSERVATION BOARD
COMPARATIVE STATEMENT OF EXPENDITURE AND REVENUE
FOR THE FIVE YEARS 1963 - 1967
(000's Dollars)

	1963	1964	1965	1966	1967
Expenditure					
Salaries	$ 1,415	$ 1,446	$ 1,543	$ 1,778	$ 1,948
General Operating					
Building rent, utilities	178	181	182	186	191
Printing, office supplies	88	87	83	89	80
Travelling, automobile	58	62	61	67	63
Machine rental and repairs	58	58	59	79	114
Telephone	20	19	22	22	25
Lab. and Field supplies	12	19	20	16	22
Miscellaneous	35	55	69	75	78
Total	449	481	496	534	573
Capital	47	45	44	46	51
Total	$ 1,911	$ 1,972	$ 2,083	$ 2,358	$ 2,572
Collections	192	222	207	237	227
Net Expenditure	$ 1,719	$ 1,750	$ 1,876	$ 2,121	$ 2,345
Revenue					
Industry Share of Tax*	$ 916	$ 924	$ 992	$ 1,114	$ 1,230
Provincial Government Share of Tax*	115	126	134	158	177
Appropriation	688	700	750	849	938
Total Revenue	$ 1,719	$ 1,750	$ 1,876	$ 2,121	$ 2,345
Percentage Increase in Net Expenditure over Previous Year	2.4	1.8	5.4	13.0	10.6

* Actual Tax Levy Adjusted for Surplus

TABLE 2

OIL AND GAS CONSERVATION BOARD

Comparison of Board Net Expenditure

Per Capable Well and Industry Production Revenue

	Total Capable Wells	Staff Complement at December 31	Industry Production Revenue (000)	*Annual Production Equivalent Barrels (000)	No. of Capable Wells Per Staff Member	Board Net Expenditure Per Capable Well (Dollars)	Board Net Expenditure Per Equivalent Barrel (Cents)
1963	14,287	247	600,500	238,282	58	120	.72
1964	15,295	246	652,368	254,825	62	115	.68
1965	16,299	259	704,267	274,786	63	115	.68
1966	16,980	264	791,913	307,948	64	125	.69
1967	17,543	272	911,194	357,331	64	133	.66

$$\text{Equivalent Barrels} = \frac{\text{Total industry production revenue}}{\text{Weighted average price per barrel of oil}}$$

VII PUBLICATIONS

The Board makes available to industry and the general public a wide variety of publications and maps. The pricing policy is based on the principle that those costs associated with a publication which are over and above normal operating costs must be met by revenue generated from its sale.

The publication of this report - Report of the Operations of the Oil and Gas Conservation Board - for general distribution has been discontinued but it is available on request.

In October it was announced that the Board would not publish the 1967 issue of Oil Pool, Gas Pool and Gas Plant Performance Charts. This was necessary due to complications arising from the conversion of our Data Processing equipment. Publication of the charts will not be reinstituted unless there is a significant demand for it from prospective subscribers.

The following special reports resulted from major public hearings:

OGCB 67-A Report on an Application of Alberta and Southern Gas Co. Ltd. under The Gas Resources Preservation Act, 1956.

OGCB 67-B Report and Decision on Review of Certain Solvent Flood Operations in the Pembina Cardium Pool.

OGCB 67-C Report on the Applications of Trans-Canada Pipe Lines Limited and Alberta and Southern Gas Co. Ltd. under The Gas Resources Preservation Act, 1956.

New Publications Issued in 1967

The Oil and Gas Conservation and the Oil and Gas Conservation Regulations

In December, 1966, new regulations were issued replacing the Drilling and Production Regulations, the General Regulations, Well Licence Deposit Regulations, the Board's Rules of Practice and some policy letters.

Both the Act and Regulations were made available on $8\frac{1}{2}$" x 11"

paper punched for insertion in standard three-ring binders. (Price $1.00) Amendments will be advertised and supplied free of charge upon request.

Conservation in Alberta, 1966

This report was issued for the first time to acquaint the members of the Legislative Assembly of Alberta and the public at large with the conservation of Alberta's oil and gas resources and with the role of the Board. This report was issued on a complimentary basis.

MAP OF

ALBERTA

SHOWING

DESIGNATED OIL AND GAS FIELDS, MAIN OIL AND GAS PIPE LINES, REFINERIES, GAS PLANTS, PRINCIPAL TOWNS AND CITIES

LEGEND

- FIELD, MAINLY OIL
- OIL REFINERIES
- OIL SANDS (area evaluated by Board)
- OIL PIPE LINES
- FIELD, MAINLY GAS
- GAS PLANTS
- GAS PIPE LINES

Note - Pipe line information has been obtained from the Oil and Gas Fields and Main Pipe Lines map published by the Department of Mines and Minerals, Edmonton; certain pipe lines have been deleted in congested areas...
- Figure by refinery or plant symbol denotes the number existing within a restricted area; the figure is omitted for single installations...
- Scale: 1 inch = 40 miles

PREPARED BY OIL AND GAS CONSERVATION BOARD, CALGARY ALBERTA, REVISED TO MARCH, 1968

JAN 4 1974